

SHORT REPORTS

Loneliness as a risk factor for care home admission in the English Longitudinal Study of Ageing

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Abstract

Background: loneliness has an adverse effect on health and well-being, and is common at older ages. Evidence that it is a risk factor for care home admission is sparse.

Objective: to investigate the association between loneliness and care home admission.

Setting: English Longitudinal Study of Ageing (ELSA).

Participants: two-hundred fifty-four individuals across seven waves (2002–15) of ELSA who moved into care homes were age, sex matched to four randomly selected individuals who remained in the community.

Methods: logistic regression models examined associations between loneliness, socio-demographic factors, functional status and health on moving into care homes.

Results: loneliness (measured by the University of California, Los Angeles (UCLA) Loneliness Scale and a single-item question from the Center for Epidemiological Studies Depression Scale (CES-D)) was associated with moving into a care home (CES-D OR 2.13, 95% CI 1.43–3.17, $P = 0.0002$, UCLA OR 1.81, 95% CI 1.01–3.27, $P = 0.05$). The association persisted after adjusting for established predictors (age, sex, social isolation, depression, memory problems including diagnosis of Alzheimer's disease, disability, long-term physical health and wealth). The impact of loneliness (measured by CES-D) on admission accounted for a population attributable fraction of 19.9% (95% CI 7.8–30.4%).

Conclusions: loneliness conveys an independent risk of care home admission that, unlike other risk factors, may be amenable to modification. Tackling loneliness amongst older adults may be a way of enhancing wellbeing and delaying or reducing the demand for institutional care.

Keywords: loneliness, care homes, cohort study, older people

Introduction

In the UK, ~400,000 people live in care homes, including one in six of the population aged over 85 years [1]. Many admissions are precipitated by a crisis event, and few people prefer to move into a home if alternatives are available [2]. Finding ways of preventing or delaying admissions to care homes will align with older adults' preferences for care, and may reduce overall welfare costs [3].

A range of individual characteristics is known to be associated with admission to care homes [4–9] including older age, poor health, functional or cognitive impairment and dementia [10]. Evidence that people who live alone are more likely to move into a care home is inconclusive [11, 12]. Whether persistent feelings of loneliness (i.e. unhappiness with the quality and quantity of their relationships) or social isolation (having few or no contacts or ties with other people) [13] influence decisions to move into care homes, is unclear.

Older adults who are lonely or socially isolated have a higher risk of functional decline and cognitive impairment [14], which may increase the need for residential care. People who report low levels of perceived social support, little engagement in social activities or few social contacts, have been shown to be more likely to move into a care home in studies in the USA and Sweden [4, 15–17]. Russell and colleagues' study of 3,097 rural Iowans in the early 1980s, found that older adults with the highest loneliness scores (9–12, on the four-item UCLA loneliness scale) were more than six times as likely to be admitted to nursing home over the following 4 years, when compared with the least lonely [17]. No recent studies have investigated the effect of loneliness on the likelihood of care home admission in a large, nationally representative or unselected European population.

The aim of this study was to investigate the influence of loneliness on admission to care homes, independent of isolation and other potential risk factors.

Methods

Participants

The English Longitudinal Study of Ageing (ELSA) is a population-based study of adults aged 50 years and above. Participants (15,783 individuals) have been surveyed at 2-year intervals since 2002. Full details of ELSA methodology are reported elsewhere [18]. In this study, we use the term care home to describe (nursing) homes with employed registered nurses, and (residential) homes without any nursing staff on site. For our analysis, care home residents (cases) were identified by their recorded place of residence, and data extracted from the survey wave before they were first noted to be living in a care home. Participants in wave one, who were recorded as being in care homes or as having moved into care homes after recruitment into the study, but before data collection, were excluded from the analysis. Age (exact year) and sex-matched controls from ELSA participants who lived in private households were randomly selected with replacement at each wave in a four to one ratio. All participants were eligible to be a control until the wave prior to the wave when they were recorded as living in a care home.

Variables in our analysis were selected to describe participants' socio-demographic characteristics, physical health, mental health, functioning, isolation and perceptions of loneliness (see Supplementary material Box 1 is available in *Age and Ageing* online).

Loneliness was measured in two ways. Firstly, the three-item University of California, Los Angeles (UCLA) Loneliness Scale [19]. This asks how often the respondent feels left out; isolated from others; or that they lack companionship. Each question was scored on a three-point scale of 'never or hardly ever' and 'some of the time' and 'often'. A score of six or more was classed as lonely. Secondly, a single loneliness item from the Center for Epidemiological Studies Depression Scale (CES-D) was also used [20]. This asks whether respondents felt lonely

much of the time during the past week. The three-item UCLA scale has been validated and shown to be reliable among older adults, and its correlation with the CES-D single-item measure suggests that both tools measure similar constructs of loneliness [19].

Social isolation was measured using an approach developed by Steptoe and colleagues [21]. One point was assigned to an individual who is unmarried/not cohabiting; where contact with children, other family members and friends is less than monthly; and where individuals do not participate in organizations such as social clubs or residents groups. Scores range from 0 to 5, and a score >2 is used to indicate isolation, in line with previous work [21].

Statistical analysis

The impact of loneliness on entry into care homes was investigated with two sets of models: one for the CES-D item for loneliness and one for the three-item UCLA Loneliness Scale. Inverse probability weights to account for missingness in loneliness variables were calculated for cases and controls using logistic regression with non-response (to loneliness) as an outcome variable, and age, wave, and ever having had memory problems as predictors. Weighted logistic regression models, adjusting all analyses for sex, age (tertiles), and wave (study design factors) and loneliness were used throughout (Table 1). The impact of other risk factors on the relationship between loneliness and risk of moving into a care home was investigated using additional covariates in the main model. All models were robust to the inclusion of age as either a continuous or categorical (tertiles) variable, we report findings from the categorical age models. An initial analysis was undertaken to ensure that relaxing the conditional assumption of the nested case-control design was valid by using adjustment in the unconditional model (not reported here).

Weighted logistic regression analysis was undertaken using R software version 3.30 (R Core team, Vienna, Austria), multiple imputations and the population attributable fraction (PAF) were calculated in Stata version 14 (TX: StataCorp LP).

Results

Three hundred and thirteen (2.0%) of 15,783 ELSA participants resident in the community moved into a care home between waves 2 and 7. Fifty-nine individuals were excluded as they provided no interview data in the wave preceding admission to a care home. Table 1 lists characteristics of the 254 eligible cases and 1,016 age, sex and wave matched controls. The UCLA questionnaire was not administered in wave 1.

Univariate investigation of loneliness with a weighted logistic regression saw an increased risk of entry into a care home for both CES-D (OR 2.13, 95%CI 1.43–3.17, $P = 0.0002$) and UCLA loneliness (OR 1.80, 95%CI 1.01–3.27, $P = 0.05$). These models, adjusted for age, sex and study

Table 1. Socio-demographic and health characteristics of cases and controls drawn from ELSA

	All waves			
	Cases		Controls	
Number of participants	254		1,016	
Age, years: mean (s.d.)	82.1	7.9	82.1	7.9
Cognitive scores: mean (s.d.)	6.6	3.8	11.3	4.0
	<i>n</i>	%	<i>n</i>	%
Cognitive scores missing	98	38.6	131	12.9
Female	174	68.5	696	68.5
CES-D lonely	71	28.0	213	21.0
CES-D lonely missing	72	28.3	46	4.5
UCLA lonely ^a	30	11.8	156	15.4
UCLA lonely missing ^a	172	67.7	414	40.7
Poor self-rated health	108	42.5	309	30.4
Lowest wealth tertile	102	40.2	314	30.9
Moderate disability	142	55.9	335	33.0
Mild disability	41	16.1	81	8.0
Unmarried	171	67.3	635	62.5
Living alone	144	56.7	544	53.5
No living children	41	16.1	154	15.2
No living siblings	118	46.5	424	41.7
Isolated	38	15.0	188	18.5
Isolated missing	162	63.8	276	27.2
Depressed	74	29.1	223	21.9
Depressed missing	74	29.1	49	5.8
Psychiatric problems	30	11.8	54	5.3
Diagnoses and health conditions				
Dementia	74	29.1	31	3.1
Heart disease	97	38.2	301	29.6
Stroke	59	23.2	94	9.3
Diabetes	42	16.5	97	9.5
High blood pressure	141	55.5	529	52.1
Arthritis	123	48.4	486	47.8
Cancer	22	8.7	101	9.9
Lung disease	12	4.7	73	7.2

^aUCLA loneliness scale was not administered at wave 1 of ELSA.

wave, are the baseline models. The impact of loneliness (as measured by the CES-D loneliness item) on care home admission in the baseline model accounted for a PAF of 19.9% (95% CI 7.8–30.4%).

In multivariable analyses using the baseline model plus established predictors and potential confounders, CES-D loneliness remained a risk factor for care home admission when the model included any of the previous predictors (OR ranged between 1.73–2.29, but all remained significant with P values <0.05) (see Supplementary Table 1 is available in *Age and Ageing* online). The effect was of a similar magnitude even after adjusting for all factors (OR 1.55, 95% CI 0.82–2.91) although due to the number of missing observations this effect ceased to be conventionally statistically significant ($P = 0.17$). After adjusting for all factors, the CES-D impact on care home admission accounted for a PAF of 13.4% (95% CI –8.1 to 30.6%).

The multivariable models of UCLA loneliness showed a similar consistent elevation throughout adjustments (OR range from 1.46–1.81), though due to the smaller number of individuals with a measured value for UCLA loneliness, this variable did not remain conventionally statistically

Table 2. Association between loneliness and risk of entering a care home amongst ELSA participants

Model	<i>n</i>	Odds ratio*	[95% CI]	<i>P</i>
CES-D				
Baseline	1,152	2.13	[1.43–3.17]	<0.001
Baseline ^a	819	2.51	[1.38–4.54]	0.003
Baseline + isolation	819	2.36	[1.30–4.27]	0.005
MI (baseline + isolation) ^b	1,270	2.12	[1.49–3.00]	<0.001
UCLA				
Baseline	683	1.81	[1.01–3.27]	0.049
Baseline ^a	618	1.81	[0.95–3.47]	0.073
Baseline + isolation	618	1.78	[0.94–3.37]	0.077
MI (baseline + isolation) ^b	1,270	1.73	[1.17–2.57]	0.006

*Adjusted for age (in tertiles), study wave and gender. CI, confidence interval.

^aBaseline model for individuals not missing isolation data.

^bMultiple imputations: Loneliness estimate adjusted for social isolation, age, study wave and gender (imputation model includes both outcomes, age, study wave, gender plus all other factors in Supplementary Table 1, available at *Age and Ageing* online in imputation model).

significant (see Supplementary Table 1 is available in *Age and Ageing* online).

Social isolation contained a large amount of missing data, (34.5% missing, $n = 438$) which may have impacted on the individuals contributing to the analysis. To ensure the risks of loneliness adjusted for isolation were robust, a sensitivity analysis restricted to individuals with measured isolation was undertaken, the estimates for both CES-D and for UCLA loneliness were similar to the model including all individuals (Table 2).

In a sensitivity analysis to the robustness of the missing data using multiple imputations loneliness was associated with an increased risk of care home admission, whether measured by CES-D (OR 2.12, 95% CI 1.49–3.00) or UCLA (OR 1.73, 95% CI 1.17–2.57) (Table 2).

Discussion

Our findings suggest that loneliness is associated with an increased risk of moving into a care home, even after adjusting for other well-established factors such as age, depression, dementia, disability and social isolation. This is important, because unlike many other factors that precipitate admission, loneliness may be amenable to intervention.

Previous work has identified age, poor health, and functional and cognitive impairment as significant predictors of admission to care homes [10]. Our finding—that loneliness is an independent risk factor for admission—is plausible and consistent with observations in the only previous study of this relationship [17]. Links between loneliness and both mortality and morbidity are well-established [22, 23]. Recent analysis of data from ELSA has added evidence of an association between high levels of loneliness and progression to physical frailty [24].

A proportion of ELSA participants were not interviewed in the wave prior to care home admission, perhaps because of physical or mental ill-health. Such attrition is a potential source of bias, but our analysis adjusted for missing data on

loneliness and potential risk factors by re-weighting the models to incorporate differential loss. We have also demonstrated that our estimates were robust to missing data in other study variables using multiple imputations. Most epidemiological studies focus on only one measure of social relationships, precluding direct comparison between the objective and subjective appraisal of relationship quantity and quality [23, 25]. The inclusion of measures of social isolation as well as loneliness was a strength of our study, allowing us to establish that feelings of loneliness were associated with care home admission independent of social isolation. We took advantage of the availability of two measures of loneliness in ELSA to check the robustness of our findings to measurement change.

As populations age, the need for care home places is expected to rise and outstrip supply. Addressing loneliness is recognised as an important means of enhancing the wellbeing in older age. Our findings suggest that it may also be a way of enabling older adults to remain in their own homes, and reducing the demand for institutional care. Future research could usefully focus on identifying effective interventions to address loneliness amongst older adults, and investigating whether loneliness persists after moving into a care home.

Key points

- Loneliness is an independent risk factor for entry to a care home.
- The association between loneliness and care home admission persists after taking into account established risk factors such as age, disability, memory problems and social isolation.
- Unlike other risk factors, it may be modifiable.
- Reducing loneliness amongst older adults may prevent or postpone some admissions to care homes.
- Identifying effective interventions to address loneliness amongst older adults should be a priority.

Supplementary Data

Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

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Conflict of interest

The views expressed are those of the authors and not necessarily those of the funders, the NHS or the Department of Health and Social Care.

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Temporal associations between sexual function and cognitive function in community-dwelling older men: the Concord Health and Ageing in Men Project

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Abstract

Background: previous cross-sectional studies have reported bidirectional associations between sexual activity and cognitive function among older people. However, the temporal associations have not been studied.